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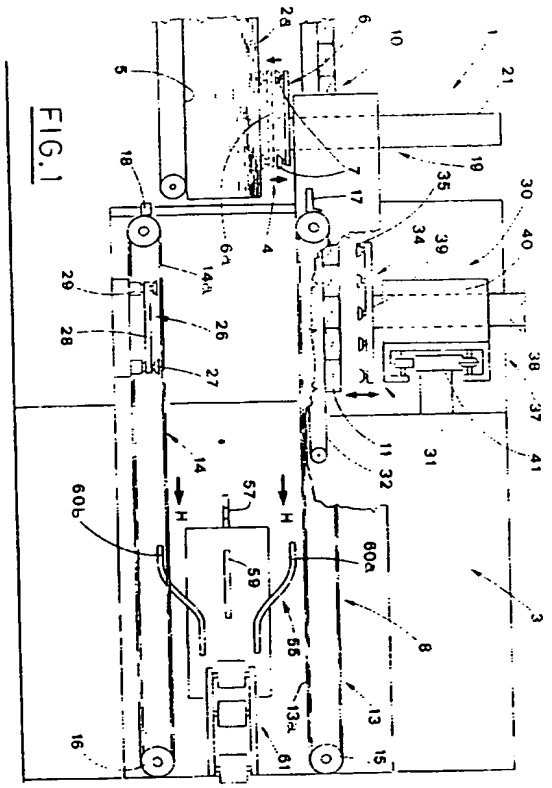
(54) Machine for automatic packaging of articles in containers obtained from tubular blanks

(57) The machine includes a device (1) for collecting tubular blanks (2) and for setting them up into container, that is equipped with first gripping means (6) movable on a vertical longitudinal plane for transferring single tubular blanks (2) from a collecting station (4) to a conveying line (8) in the region of a container set up station (9), and with second gripping means (26) which cooperate with the first gripping means (6) to form a container (20). The machine includes also a device (30) for forming regular groups (110) of articles (11), that is equipped with pick up means (34) movable on a vertical plane transversal to the conveying line (8) for transferring rows of articles (11) from a feeding line (10) to a station (12), where a regular group (110) of articles (11) is built up. In the region of the grouping station (12), pusher means (48) act to introduce the group (110) into a container (20). There is also provided a device (55) for closing the container (20), situated downstream of the set up station (9) and along the conveying line (8).

FIG.1



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Description

The present invention relates to packaging articles in cardboard containers obtained from tubular blanks. These blanks feature suitable creasing lines that define lateral walls and flaps which form bottom and top of the containers.

More precisely, every blank is made of a sheet closed in a tubular form and folded in the regions of the creasing lines so as to form two overlapped parts; each of these overlapped parts has another creasing line in the middle, parallel to the previous ones.

There are machines for setting up the said tubular blanks into containers with at least one end being left open for introduction of groups of articles therein.

According to the teachings of one of the known solutions, the blanks are removed one by one from the bottom of a stack situated in a magazine, and transferred to a set up station equipped with fixed suction cups that attach themselves to one wall of the blank; the opposite wall is held by movable suction cups, carried by a rotary cantilevered frame that causes the blank erection.

Simultaneously with the erecting operation, suitable folder members fold the opposite wings of the container bottom through an arc of 90°.

This solution brings about constructive complications, since the said rotary cantilevered frame includes a combination of arms and levers articulated to one another in order to allow the best blanks erection and easy change-over operation in relation to different sizes of the blanks.

Another known solution, disclosed in the US-A-4.414.789 uses suction elements as first collecting means, aimed at grasping the lowermost blank of the stack. The blank is then set up by the above mentioned first collecting means cooperating in first time with second collecting means, later with a strike arm and finally with third collecting means.

In order to be erected, the blank is transferred from a collecting station to an erection station, in which two lateral walls thereof are simultaneously held perpendicular to each other by the said first and third collecting means, thus causing stabilisation of the blank shape.

In still a further solution, disclosed in the IT-B-1.221.531, the lowermost blank of the stack is collected by first collecting means equipped with suction cups carried by a rotary cantilevered frame. Second collecting means, cooperating with these first ones, are carried by a second rotary cantilevered frame and erect the blank. The said first and second collecting means hold two lateral walls of the container, that are maintained perpendicular to each other.

In a further known solution, the group of articles to be introduced in the container is formed by subsequent downward article placements on a horizontal plate, moving vertically and located downstream of an articles feeding line.

A device that operates in this way, as described in the US-A-4.551.052, includes a station provided with two rollers having longitudinal face millings, in the region of which relative plates are fixed; in a rest position the two plates form a channel that receives articles. Inside the channel there are means for detecting the formation of a layer of articles placed close to one another.

When one layer is formed, the above mentioned rollers make a full turn in counter-rotating directions and transfer the layer to the plate below, or on top of the upper layer of the stack being formed on the same plate.

According to another known solution, described in the US-A-5.116.195, the articles coming in succession from a horizontal feeding line are moved downward to a plane supporting a stack of articles that is formed by such vertical translation.

This stack is then moved horizontally by suitable convey means equipped with a frame, that can perform a series of strokes of limited length in order to draw a certain number of stacks close to one another, and subsequently a longer stroke to transfer the so formed group of stacks. Then this group is moved in a transversal direction by suitable packing means.

In yet another solution a group of articles is formed upwards, beginning from a feeding station, in which a row of articles is formed; this row is subsequently raised by an elevator, situated below, until it is placed on suitable supports. The next row being raised strikes the previous one and raises it again.

In this way, a stack of articles is built up by subsequent placements of layers on the said supports. Upon completition of the stack, a pusher moves it onto a fixed platform; the next stack transferred to the platform moves the previous one and others possibly present there.

When a predetermined number of stacks, brought close one to another, has been reached, the group is introduced into a container suitably positioned on the side of the platform. A device of this type is illustrated e.g. in the IT-B-208.806.

The above mentioned solutions are considerably complex under both constructive and functional points of view, and usually also their dimensions are very big.

In particular, this disadvantage results from the fact that different working steps are performed in many working stations, distant from one another, and this leads to big dimension and limited working speed.

A considerable drawback of the above mentioned solutions derives from the fact that the stacks of articles forming the group to be introduced intc the container and the same group are not stable during the necessary working steps.

This can make difficult the subsequent step of introducing the articles into the container.

A particular problem derives also from the fact, that at present the said blanks are preferably made of recycled cardboard which is not as elastic as unused cardboard and therefore needs particular attention during the container set up step.

The object of the present invention is to propose a small dimension machine that operates at high speed and automatically introduces articles into containers obtained from tubular blanks.

The above mentioned object is obtained in accordance with the contents of the claims.

The characteristic features of the present invention are pointed out in the following description with reference to the enclosed drawings, in which:

- Fig. 1 shows a schematic lateral view of the machine for packaging articles in containers obtained from tubular blanks;
- Figs. 2 and 3 show the same lateral view of the subject machine, during subsequent working steps of the blanks collecting and set up device;
- Fig. 4 shows a transversal section of the machine taken along the sketched plane IV-IV of Fig. 3;
- Figs. 5 and 6 show the same transversal section of the subject machine, in subsequent working steps of the article grouping device;
- Fig. 7 shows a plan view of the machine, in the working step illustrated in Fig. 3;
- Fig. 8 shows a lateral view of the machine in another working step;
- Figs. 9, 10 and 11 show a plan view of the machine, in subsequent working steps of the flap closing device.

With reference to the above mentioned figures, a packaging machine 3, or the like, is equipped with a device for taking a flat folded tubular blanks 2 and set it up into a container, this device being indicated with reference number 1.

The tubular blanks 2 are fed in stacks to a collecting station 4 by conveying means 5, operated intermittently when each stack is near to finish; the stack of blanks is indicated with 2a.

The device 1 includes first gripping means 6 equipped with suction elements 7, like suction cups, for removing single tubular blanks 2 from the top of the stack 2a and transfer the removed blanks to a conveying line 8, in the region of a container set up station 9.

The conveying line 8 is in longitudinal alignment with conveying means 5 that feed the tubular blanks 2 and parallel to a line 10 that feeds the articles 11 to be introduced into the containers 20 obtained from the blanks 2.

The articles 11 are carried to a station 12, described below, in which groups of these articles 11 are formed and introduced into the containers. The station 12 is situated beside the station 9, in which the blanks 2 are erected.

The conveying line 8 includes two pairs of side by side parallel belts 13 and 14, upper and lower. On their extremities, the belts 13, 14 turn around respective pulleys 15, 16.

Cross pieces 17,18 extend perpendicularly from the belts 13,14, and the pairs of upper belts 13 and lower belts 14 are operated simultaneously and intermittently, so that the corresponding lower run 13a and upper run 14a move in the same direction H (Fig. 1).

The gripping means 6 are controlled by a robotic unit 19 that drives its movements along two perpendicular axes, on a vertical plane transversal to the conveying line 8.

The robotic unit 19 features a vertical stem 21, the lower part of which carries a plate 22 supporting the suction cups 7; in fact the suction cups 7 are arranged, turned downwards, at the corners of the plate 22, that has e.g. a square shape.

The stem 21 is slidably inserted into a ring-like slide block 23 that features a groove set in engagement with a guide 24, e.g. like a dovetail, extending along a bar 25 (see Figs. 4 and 7), which is situated longitudinally over the said conveying line 8.

The device 1 features also, in the region of the container set up station 9, second gripping means 26 including suction cups 27, situated astride the lower belts 14 of the conveying line 8.

The suction cups 27 are supported by a plate 28 that is moved along a vertical axis by actuating means 29; in fact the suction cups 27 are arranged, turned downwards, in the regions of the corners of the plate 28, this latter having e.g. square shape.

The device for forming regular groups of the above mentioned articles 11 is indicated with 30. The articles 11 are fed one by one to a pick up station 31 by conveying means 32 of the said line 10, including e.g. a belt conveyor; the articles 11 conveyed on the belt 32 stop when they strike a fixed shoulder 33, suitably positioned, as pointed out in the following.

The device 30 includes pick up means 34 equipped with suction elements 35, like suction cups, which pick up a row of articles 11 from the conveying belt 32 and transfer them onto a plate 36, situated horizontally in a station 12, in which a regular group of articles 11 is built up and introduced into a container 20.

The plate 36 is co-planar with the lower wall of the container 20 situated in the set up station 9.

The pick up means 34 are controlled by a second robotic unit 37 that drives movements thereof along two perpendicular axes, on a vertical plane transversal to the conveying belt 32.

The second robotic unit 37 features a vertical bar 38, the lower part of which carries a plate 39 supporting the suction cups 35; virtually, the suction cups 35 are arranged in pairs, turned downward, along the plate 39 so as to engage a row of articles 11 on the conveying belt 32.

The bar 38 runs through a slide 40, joined with a grooved guide 41 that extends transversally to the conveying belt 32, on a horizontal plane over the same belt 32.

In the region of the article grouping station 12, over the plate 36, the device 30 features a grouping frame

42 from which a group of articles can be easily transferred into the container 20.

The grouping frame 42 is opened at its top for insertion therein of the rows of articles, and is also opened on the side opposite to the container 20 to be filled, that means also opposite to the station 9

In particular, the grouping frame 42 includes a pair of lateral walls 42a and features, on the side close to the container 20, transversal walls 42b slightly convergent so as to form a lead-in section for the container 20.

One of the internal lateral walls 42a of the grouping frame is in alignment with the abutment surface 33a of the fixed shoulder 33 (Fig. 7). The grouping frame 42 slides on the plate 36, in horizontal direction, transversal to the conveying line 8, and is operated by a reciprocating device 43 including an oscillating arm 44 articulated to a carriage 45 that slides in a guide 46 in the transversal direction: the carriage 45 is integral with a bar 47 fastened to the grouping frame 42.

In practice, the grouping frame 42 moves between a position in which a group of articles 11 is formed over the plate 36, and a position, shifted toward the container 20, in which the same group of articles is introduced into the container 20.

Moreover, the device 30 includes a pusher 48 constituted basically by a vertical plate that forms an additional wall of the grouping frame 42, on the side opposite to the one facing the container 20, when the grouping frame is in the position where the group of articles 11 is built up.

The pusher 48 is moved in horizontal direction, transversal to the conveying line 8, by a reciprocating device 49 including an oscillating arm 50 articulated to a carriage 51 that slides in a guide 52: the carriage 51 is integral with a bar 53 fastened to the pusher 48.

The plate 36 is carried by a reciprocating operation device 54, that controls movements of the plate in the vertical direction.

This operation device 54 allows to change the vertical position of the plate 36, in particular when the size of the containers 20 is changed. The operation device 54 can be also used to control vertical movement of the plate 36 in phase relation with building up of the group of articles 11 inside the grouping frame 42.

In this way, the plate 36 can be lowered stepwise from the highest position in registry with the layers of the articles 11 being formed in succession inside the grouping frame 42.

A device 55 for closing the container 20 filled with the articles 11, is situated downstream the station 9, along the conveying line 8. This closing device 55 features movable folder elements 56 formed by a pair of blades 57 hinged on pins 58 with vertical axes, on opposite ends of the conveying line 8 and driven in a mirror-like way by known, not shown, means.

First fixed folder element 59, acting on a horizontal plane located between the belts 13,14, and second fixed folder elements 60a,60b having the profile curved and slightly convergent in the direction of the line movement, are situated downstream of the movable folder elements 56, on opposite sides of the conveying line 8.

Moreover, a taping member 61 with rollers, of conventional type, is provided downstream of the above mentioned folder elements.

Operation of the device will be now described beginning from the step, in which a tubular blank 2 is removed from the stack 2a which is situated in the collecting station 4, while resting against the conveying means 5 (Fig. 1). During this removing step the gripping means 6 are situated over a stack of blanks.

In order to remove the blank, the gripping means 6 are lowered so as to bring the suction cups 7 to contact the uppermost blank 2 of the stack 2a, in the position indicated with the sketched line 6a in Fig. 1.

Subsequent raising of the gripping means 6 causes also raising of the said blank. The lowering and raising of the gripping means 6 are determined by vertical sliding of the stem 21 of the robotic unit 19.

Subsequent movement of the slide block 23 of the robotic unit 19 along the guide 24 brings the gripping means 6 to the container set up station 9, as shown with the broken line 6b in Fig. 2, where the blank withdrawn by the same gripping means are indicated with 2b.

The gripping means 6 are lowered again so as to carry the blank 2 to contact the second gripping means 26, the suction cups 27 of which, in this step, are moved by the actuating means 29 over the surface defined by the upper run of the belts 14 (Fig. 2).

It is to be noted that the second gripping means 26 hold the blank 2 to be erected by attachment to a lower part that is designed to form a wall of the container opposite to the one defined by the upper part, which the first gripping means 6 grasp.

Therefore, raising and simultaneous translation of the gripping means 6, as indicated with the sketched line 6c in Fig. 3, cause progressive erection and shaping of the blank, as indicated with the broken line 2c.

When this raising and translation step is completed by the gripping means 6, the blank takes the parallelepiped shape of the container 20.

The bottom and top flaps of this container 20 are opened and the container is ready to be filled with groups of articles 11 formed in the station 12 (see also Figs. 4 and 7).

The articles 11 are picked up from the conveying belt by the pick up means 34 that during this step are situated over the row of articles 11, in the pick up station 31 (Fig. 1).

In order to pick up the articles, the pick up means 34 are lowered so as to bring the suction cups 35 to contact the articles 11, as seen in Fig. 4. Subsequent raising of the pick up means 34 causes also raising of the articles. Lowering and raising of the pick up means 34 are determined by vertical sliding of the bar 38 of the second robotic unit 37.

Subsequent movement of the slide 40 of the second

robotic unit 37 along the guide 41 brings the pick up means 34 to the station 12. in which a regular group of articles 11 is formed. as seen in Figs. 4 and 7.

At this point. the pick up means 34 are lowered again so as to insert the articles 11 into the grouping frame 42. as shown in Fig. 4. where the broken line 34a indicates the position taken by the pick up means 34 during this step.

In fact. the row of articles 11 is put into the space delimited by the lateral walls 42a of the grouping frame 42 and by the pusher 48. adjacent thereto. Likewise. some other rows of articles 11 are transferred inside the grouping frame 42 and progressively arranged one beside another. while the layers of articles are put one on another. These subsequent placements of rows of articles 11 build up a regular group. indicated with 110 (Fig. 5).

It is to be pointed out that during building up step. the group 110 is held on three consecutive sides faced by the lateral walls 42a of the grouping frame 42 and by the pusher 48. adjacent thereto.

When the regular group 110 of articles has been formed. the grouping frame 42 and the pusher 48 are simultaneously translated toward the motionless container 20 located in the station 9 of the conveying line 8: this translation is operated by rotation of the related oscillating arms 44.50 that control movement of the carriages 45.51 along the guides 46. 52 (Fig. 5).

In this way the grouping frame 42 is positioned so as to form a lead-in section for the container 20. ready for the introduction of the group 110 of articles 11. Obviously. translation of the grouping frame 42 and the pusher 48 determines the movement of the group 110 of articles 11 formed inside the same grouping frame.

After having reached the advanced position in which the head of the group 110 has entered the container. the grouping frame 42 stops while the pusher 48 continues its movement forward for translation of the group with respect to the grouping frame (Fig. 6). Then. the group 110 is pushed into the container 20.

When the container 20 has been filled with the articles 11 (Figs. 6 and 8). the grouping frame 42 and the pusher 48 return to the group building up position. It is to be noted that during introduction of the articles 11. the gripping means 6 and 26 still hold the opposite walls. upper and lower. of the container 20.

In practice. when the container 20 is being erected and shaped. the blank is kept by the gripping means 6. 26 that prevents it from folding back. even if the blank is made of recycled cardboard and the like.

It is also to be noted that the distance between the belts 13 and 14 of the conveying belt 8 is suitably bigger than the height of the container 20 so as not t-o interfere with the set up of the same container.

After having completed filling of the container 20 with the articles 11. the gripping means 6 and 26 release the opposite walls of the container 20. that is then moved forward by the belts 13.14 of the conveying line 8. driven simultaneously in opposite directions. as indicated with the sketched line 20a in Fig. 8. The cross pieces 17.18 of the belts 13.14 engage the container 20.

The movement of the container imposed by the conveying line 8 causes engagement of the closing device 55. situated downstream of the set up station 9. This closing device 55 features folder elements 56.59 and 60a.60b that close the opposite flaps of the bottom and the top of the container 20.

More precisely. in a first step the blades 57 of the movable folder elements 56 swing in direction opposite to the line movement direction. and fold the fore vertical flaps 201 of the container 20 that is entering the region of the closing device 55 (Fig. 9).

Folding of the flaps 201 is completed by the first fixed folder elements 59. that acts on a horizontal plane. while at the same time. the second fixed folder elements 60a.60b. which have a convergent profile. begin folding of the horizontal flaps 202 (Fig. 10).

The return swing stroke of the blades 57 causes initial folding of the rear vertical flaps 203. while the first fixed folder elements 59 complete this folding during the movement of the container 20 along the conveying line 8. as indicated with the sketched line 20b in Fig. 11: the second fixed folder elements 60a.60b finish the folding of the horizontal flaps 202.

Finally. the taping means 61 close the container 20 by a suitable adhesive tape. as schematically indicated with the sketched line 20c (Fig. 11).

It is to be pointed out that only one container is transported each time along the conveying line 8. When this container leaves the conveying line. a subsequent blank is set up into a container in the set up station 9.

The proposed device allows to remove blanks from a stack in very simple and easy way. and to set them up into containers. to form regular groups of articles. and subsequently to introduce these groups of articles into the containers. and finally. to close the containers.

In fact. the operations of removing the blanks and setting them up into containers. as well as the grouping of articles to be packaged. are carried out by gripping and pick up means operated by mechanisms working with a combination of straight movements. with high speed. Besides. change-over of the device in relation to different sizes of the blanks is made easier and quicker.

The considerable reduction of diverse working stations and more effective reciprocal connection thereof result also in a smaller size and higher working speed. as well as in constructive and functional simplicity.

An important feature of the described device is that it ensures stability of the groups of articles during all necessary working steps.

Actually. the groups are formed by subsequent placements of articles into the grouping frame. from which they are later transferred into the containers. without any intermediate movement.

Moreover. during the group forming step as well as during the container filling step. these groups are guided

on three sides by the grouping frame and the pusher.

In the embodiment illustrated in the enclosed figures. the robotic unit 19 moves the gripping means 6 along two perpendicular axes and. more precisely, on a vertical plane parallel with respect to the conveying means 5 and to the conveying line 8: this is possible because the conveying means 5 and the conveying line 8 are in longitudinal alignment.

It is understood that this is an advantageous simplification and not a limitation. because nothing prevents the robotic unit 19 from having also another longitudinal axis perpendicular to both previously mentioned axes.

Also the second robotic unit 37 moves the gripping means 34 along two perpendicular axes and. more precisely. on a vertical plane transversal to the conveying means 5: this is possible because the abutment surface 33a. which is in alignment with the lateral internal wall 42a of the grouping frame. does not need to be moved longitudinally. i.e in the direction defined by the conveying means 10.

Also in this case this is an advantageous simplification and not a limitation. because nothing prevents the second robotic unit 37 from having also another longitudinal axis perpendicular to both the previously mentioned axes.

Alternatively. the suction cups 35 can be substituted by pliers that grip the sides of the row of articles 11: obviously these pliers must not change reciprocal positioning of the articles.

Moreover, using suction cups 35 or otherwise pliers. it is possible to pick up two or more rows of articles arranged side by side or two or more rows of articles put one on the other.

Claims

1. Machine for automatic packaging of articles in containers obtained from tubular blanks (2), each of the said blanks (2) being obtained from a sheet folded tubular form and featuring creasing lines which define lateral walls as well as bottom and top flaps of a container (20), characterised in that it includes a device (1) for collecting the said tubular blanks (2) and setting them up into containers, this collecting and set device (1) including first gripping means (6), movable on a longitudinal vertical plane for transferring single tubular flat folded blanks (2) from a collecting station (4) to a conveying line (8), in the region of a container set up station (9), and second gripping means (26), situated in the said container set up station (9) and which cooperate with the said first gripping means (6) to set up containers (20):

   a device (30) for forming regular groups (110) of articles (11), including pick up means (34). movable on a vertical plane transversal to the said conveying line (8) for transferring rows of articles (11) from an article feeding line (10) to a station (12). in which a regular group (110) of the said articles (11) is formed, and which is situated beside the said set up station (9):
   pusher means (48) acting in the region of the said article grouping station (12). to introduce each time a group (110) of articles (11) into a container (20):
   a container closing device (55) situated downstream of the said set up station (9) along the said conveying line (8).

2. Machine. according to claim 1. characterised in that said blank collecting and set up device (1) includes first gripping means (6). aimed at collecting single tubular flat folded blanks (2) from the top of a stack (2a) in the region of said collecting station (4):

   a robotic unit (19) that controls movement of the said first gripping means (6) along two perpendicular axes. on a longitudinal vertical plane. for transferring the blank (2) from the said stack (2a) to a container set up station (9) located along said conveying line (8):
   second gripping means (26), situated in the lower part of the said container set up station (9) and aimed at holding a lower wall of the said blank (2) during raising of the opposite wall by the said first gripping means (6), to set up a container (20).

3. Machine, according to claim 1. characterised in that the said second gripping means (26) include suction means (27) moved vertically by actuating means (29) between a lowered disengagement position and a blank collecting position located over a plane defined by the conveying means (14) of the said conveying line (8).

4. Machine, according to claim 1, characterised in that the said first gripping means (6) include suction means (7) supported by a stem (21) of a robotic unit (19). sliding vertically on a slide block (23), that moves on a guide (24) extending longitudinally over the said conveying line (8), for reciprocation of the same gripping means (6) between the said collecting station (4) and the said container set up station (9).

5. Machine, according to claim 2, characterised in that the said step, in which the wall of the said blank (2) opposite to the wall held by the said second gripping means (26), is raised so as to form the said container (20), is obtained by a combined movement of vertical sliding and longitudinal translation of the said first gripping means (6).

6. Device, according to claim 1, characterised in that

the said conveying line 8 includes at least two pairs of parallel belts (13,14), upper and lower, moved intermittently in synchrony and in opposite directions, with the belts (14) of the lower pair situated on both sides of the said container set up station (9), and with cross pieces (17,18) extending from said belts (13,14) upper and lower for engagement of one already filled container (20) in the said container set up station (9), to transfer it toward folder elements (30) located between the said pairs of belts (13,14), and close opposite flaps of the bottom and top of the container.

7. Device, according to claim 5, characterised in that the distance between the lower run (13a) of the upper pair of belts (13) and the upper run (14a) of the lower pair of belts (14) is bigger than the height of the above mentioned container (20).

8. Machine, according to claim 1, characterised in that said pick up means (34) grips a row of articles (11) fed by the conveying means (32) of the said feeding line (10), in the region of a pick up station (31), while a robotic unit (37) controls movement of the said pick up means (34) along two perpendicular axes, on a vertical plane transversal to the said conveying means (32), for transferring the row of articles (11) to a grouping frame (42) located in the said article grouping station (12), where a regular group (110) of articles (11) is formed, with a pusher (48) cooperating with the said grouping frame (42) to delimit a space in which the said regular group (110) is built up by subsequent placements of rows of the said articles (11), and to insert the same group (110) of the articles (11) into a container (20).

9. Machine, according to claim 6, characterised in that the said pick up means (34) include suction means (35) supported by a bar (38) of the said robotic unit (37), that moves vertically on a slide (40) movable on a guide (41) that extends transversally to the said conveying means (32, for reciprocation of the same pick up means (34) between the said pick up station (31) and the said article grouping station (12), in which a regular group (110) is formed.

10. Machine, according to claim 6, characterised in that the said grouping frame (42) is opened at the top for insertion therein of rows of articles (11), and at the side opposite to the one facing the said container (20) to be filled, with the said pusher (48) situated in the region of the said opened side.

11. Machine, according to claim 1, characterised in that the said closing device (55) includes movable folder elements (56) formed by a pair of blades (57) hinged on vertical pins (58) located on opposite ends of the conveying line (8) and swinging so as to fold alternatively the fore vertical flaps (201) and rear flaps (203) of the said container (20).

12. Device, according to claim 1, characterised in that the said article grouping station (12) includes a plate (36) defining the base of the said grouping frame (42) and the support for the said group (110).

13. Device, according to claim 12, characterised in that the said plate (36) moves vertically between a raised position, inside the grouping frame, and a lowered position in which it defines the base of the grouping frame, the said lowering being stepwise to keep the plate in registry with the placements of subsequent layers of articles (11) inside the grouping frame (42).

14. Machine, according to claim 1, characterised in that the said pick up means (34) transfer at least two rows of articles (11), arranged side by side, from the said feeding line (10) to the said article grouping station (12).

15. Machine, according to claim 1, characterised in that the said pick up means (34) transfer at least two rows of articles (11), arranged one over the other, from the said feeding line (10) to the said article grouping station (12).

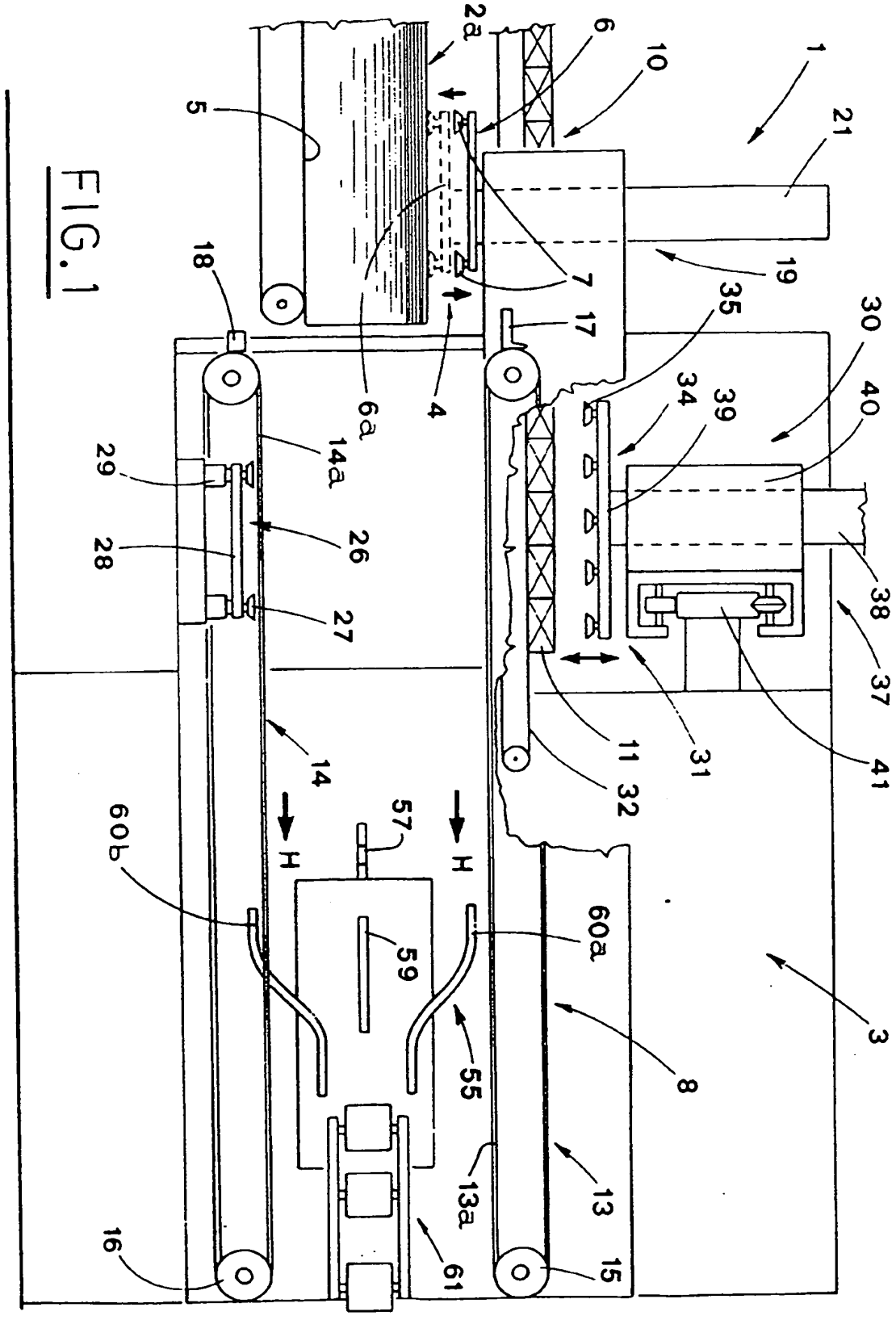
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FIG.1

FIG. 2

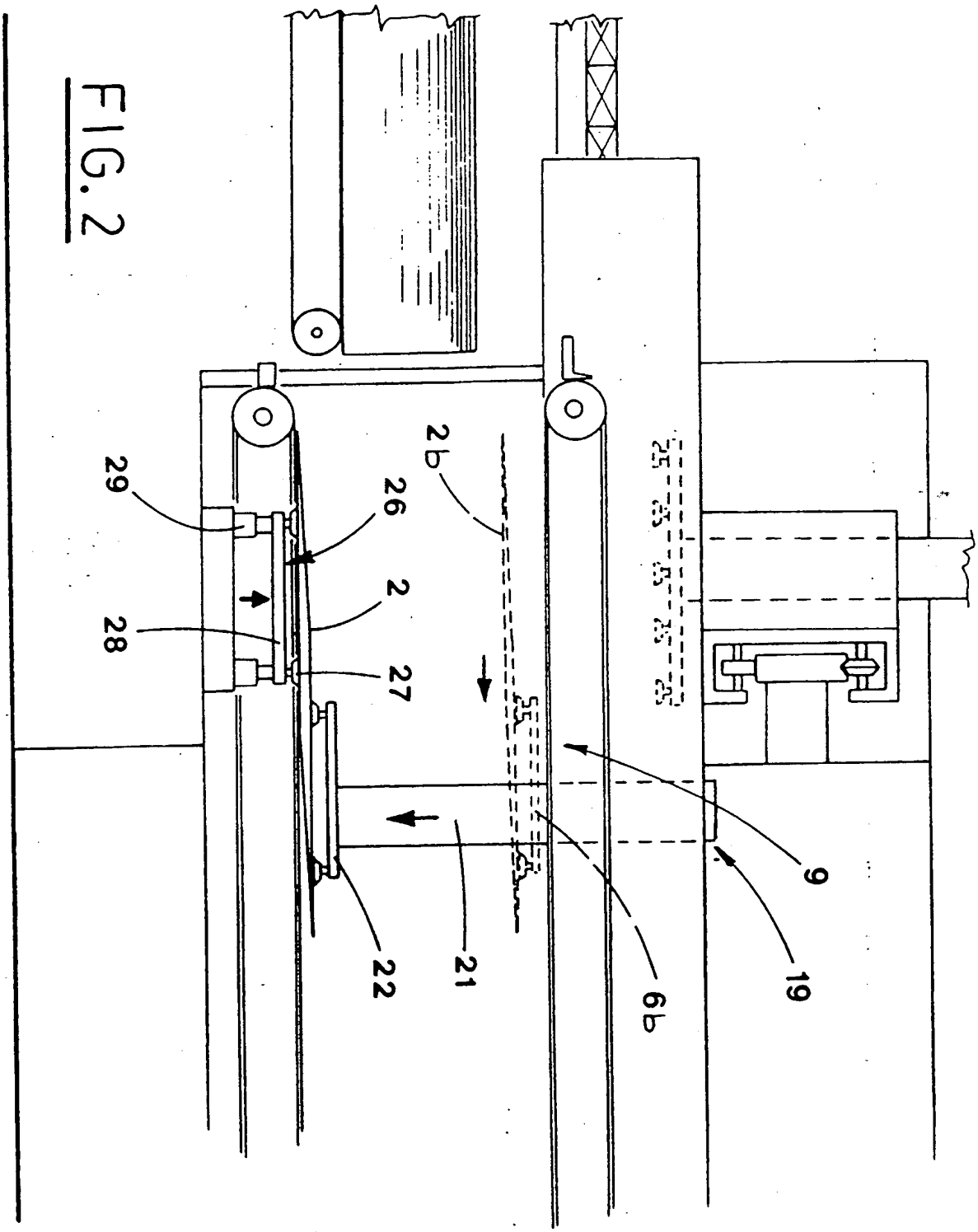
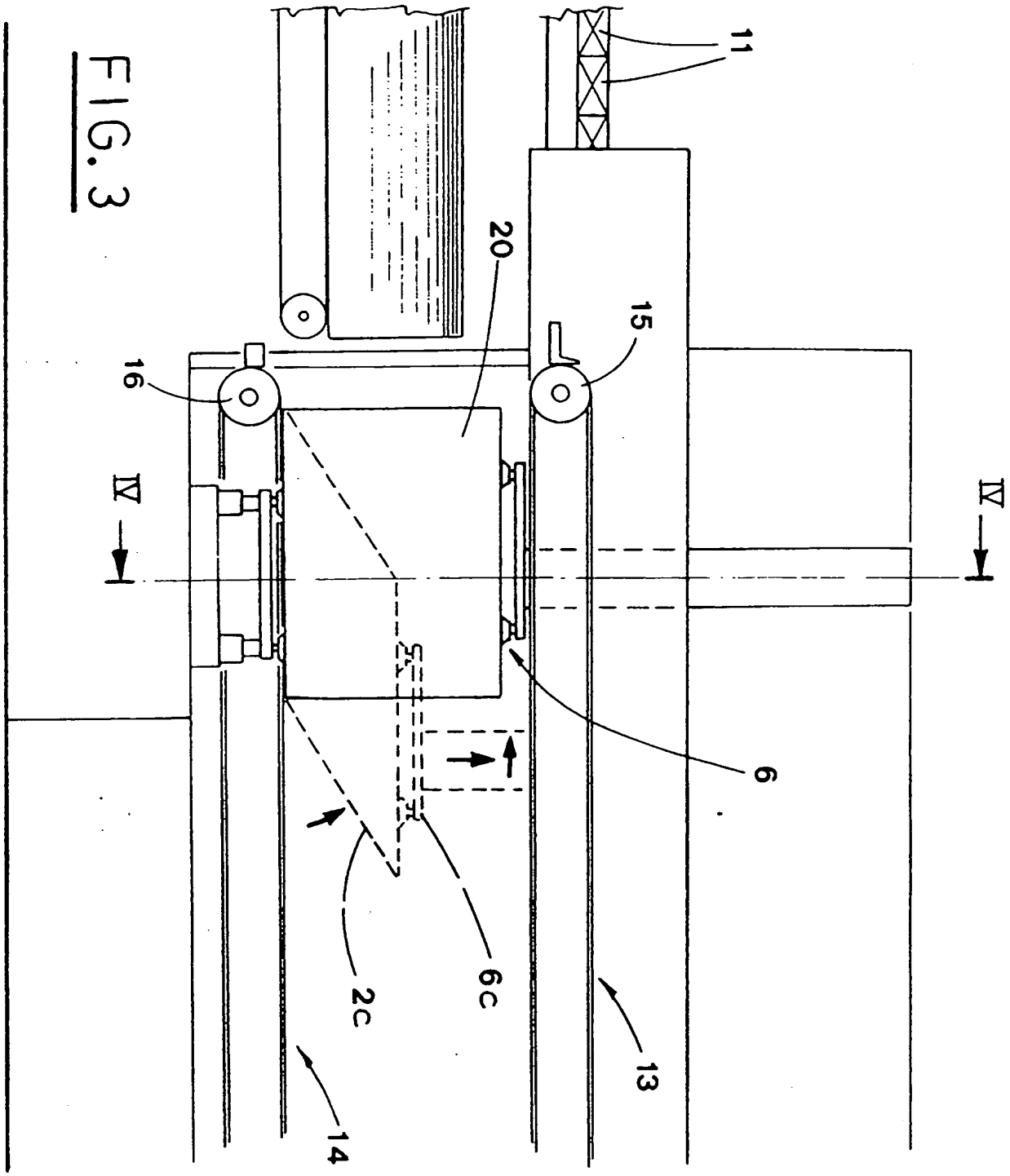


FIG. 3



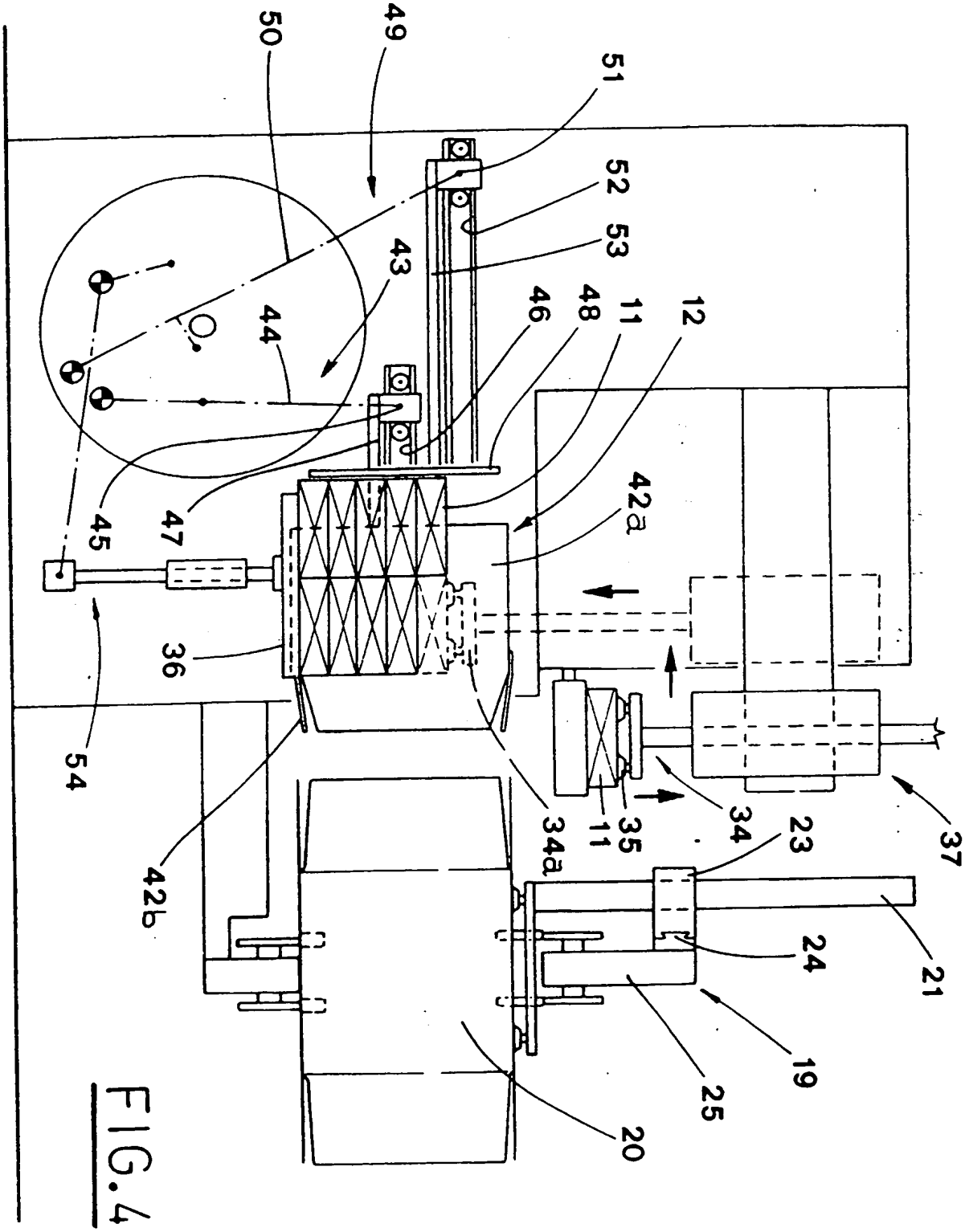

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FIG.4

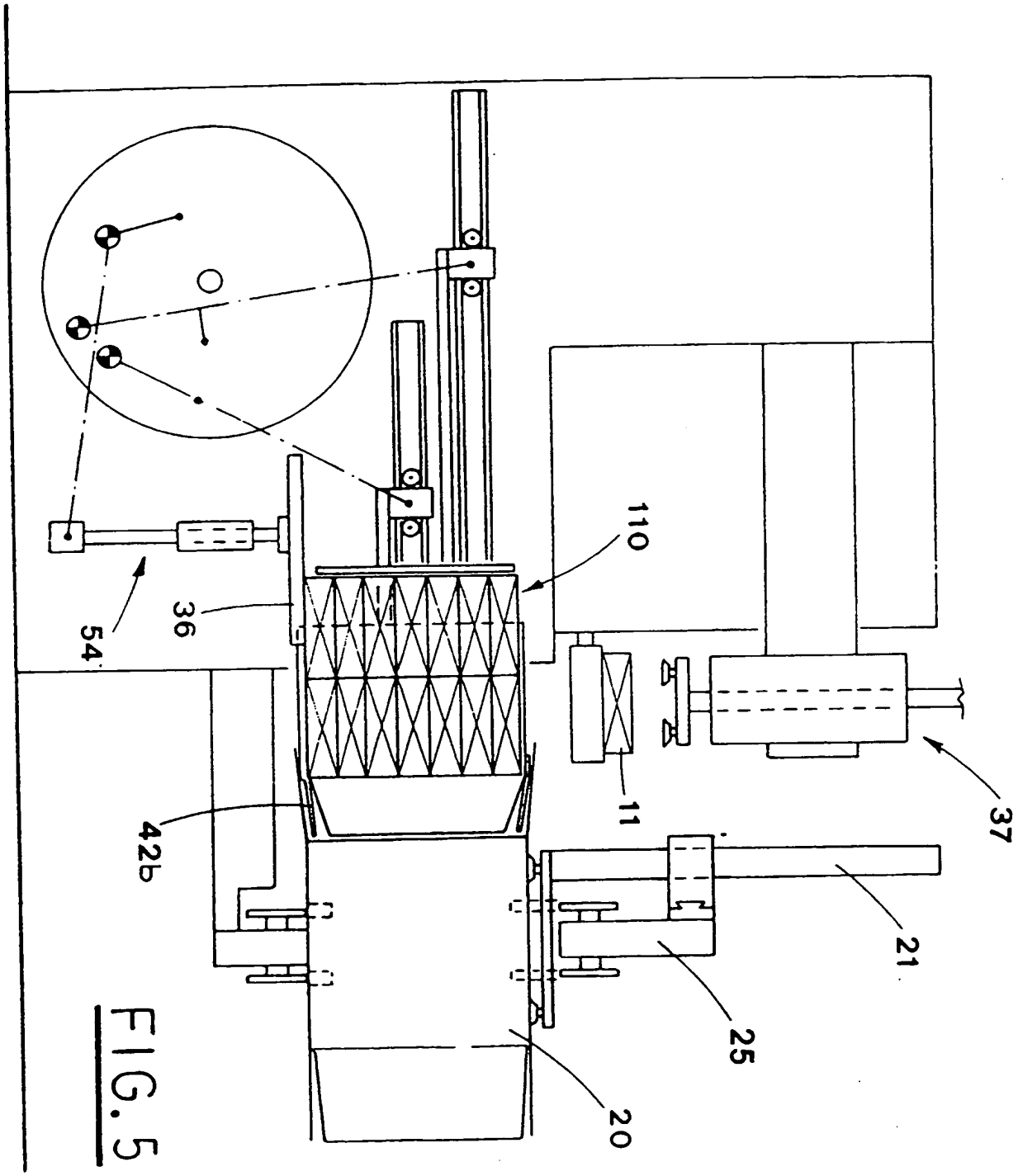


FIG. 5

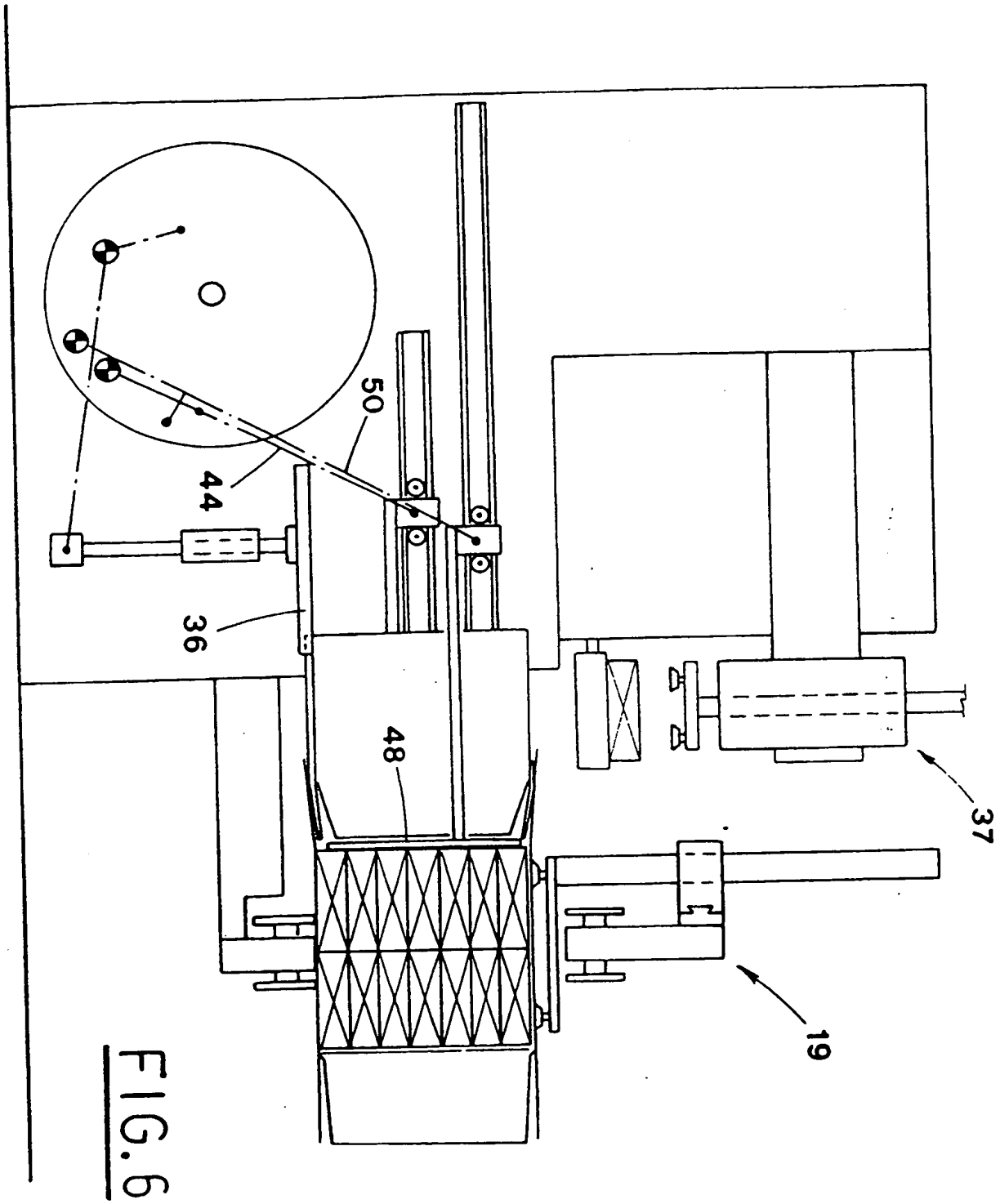


FIG.6

FIG.7

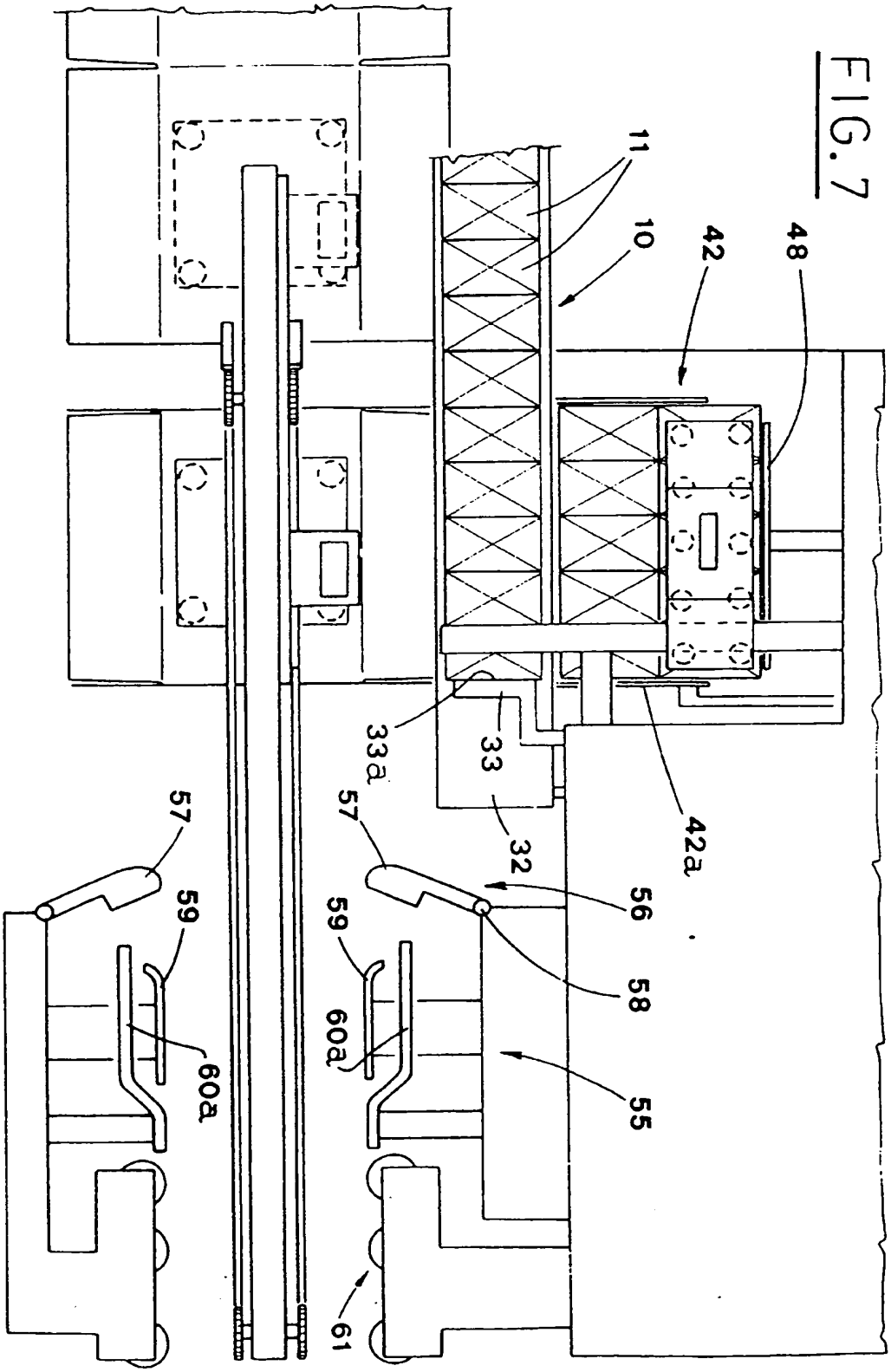


FIG.8

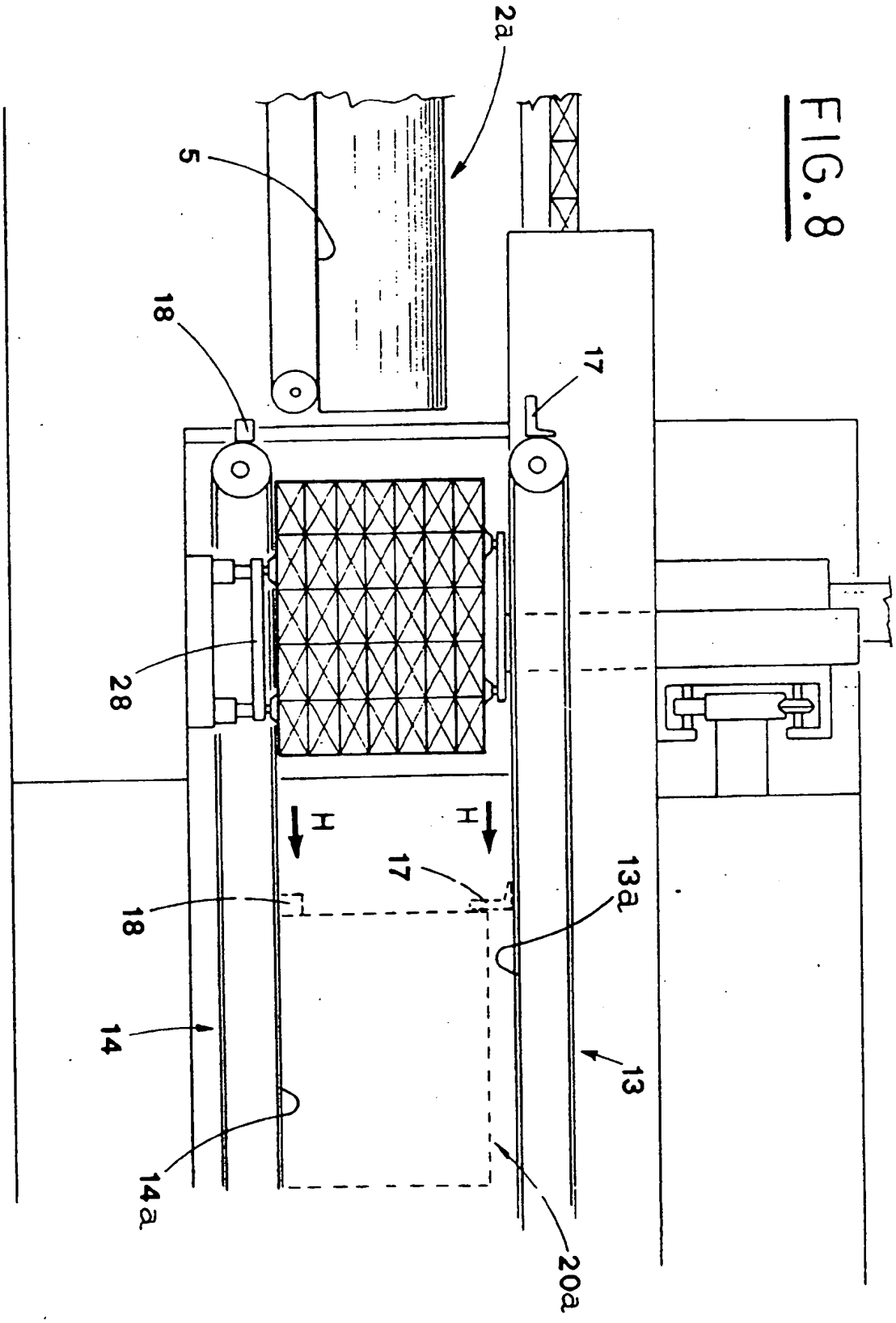


FIG.9

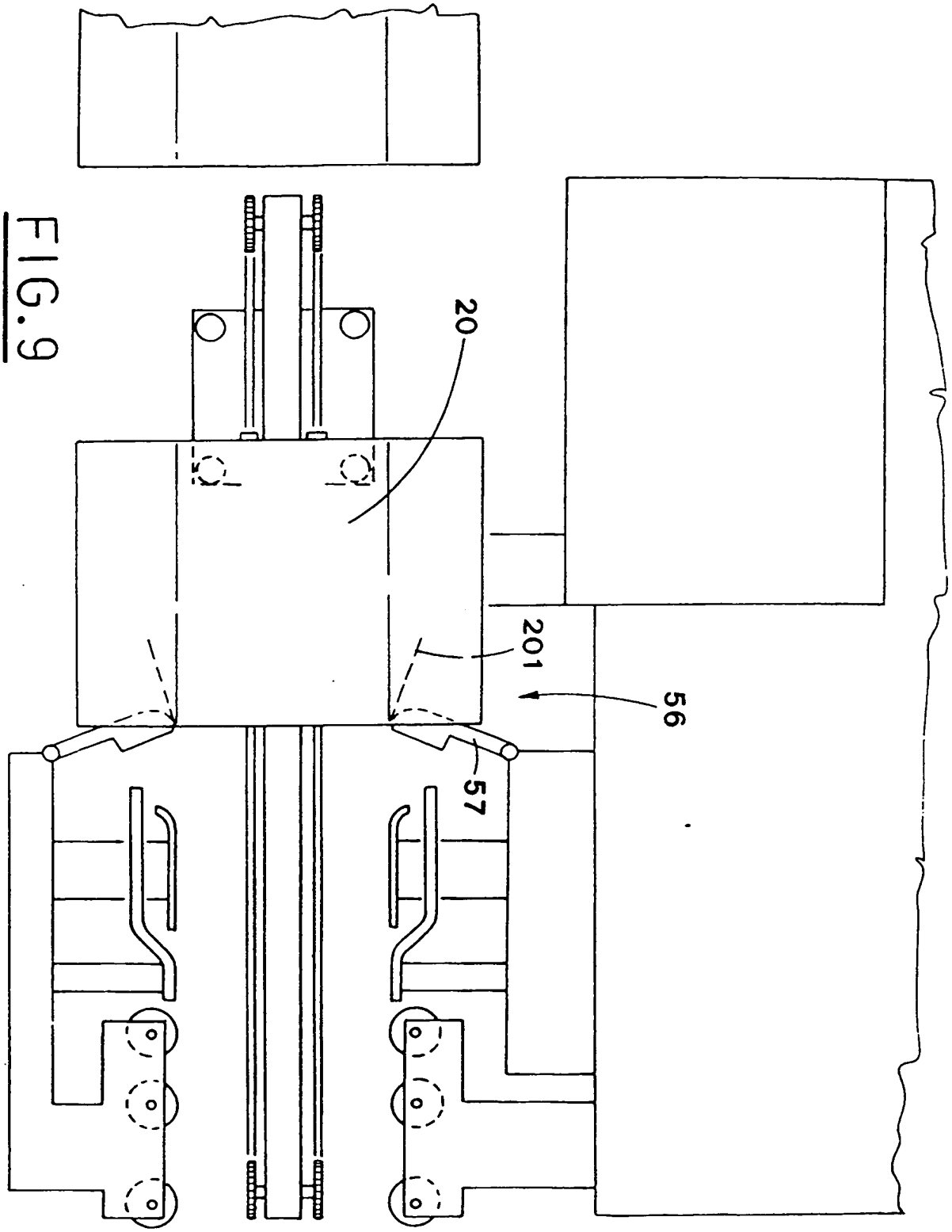


FIG.10

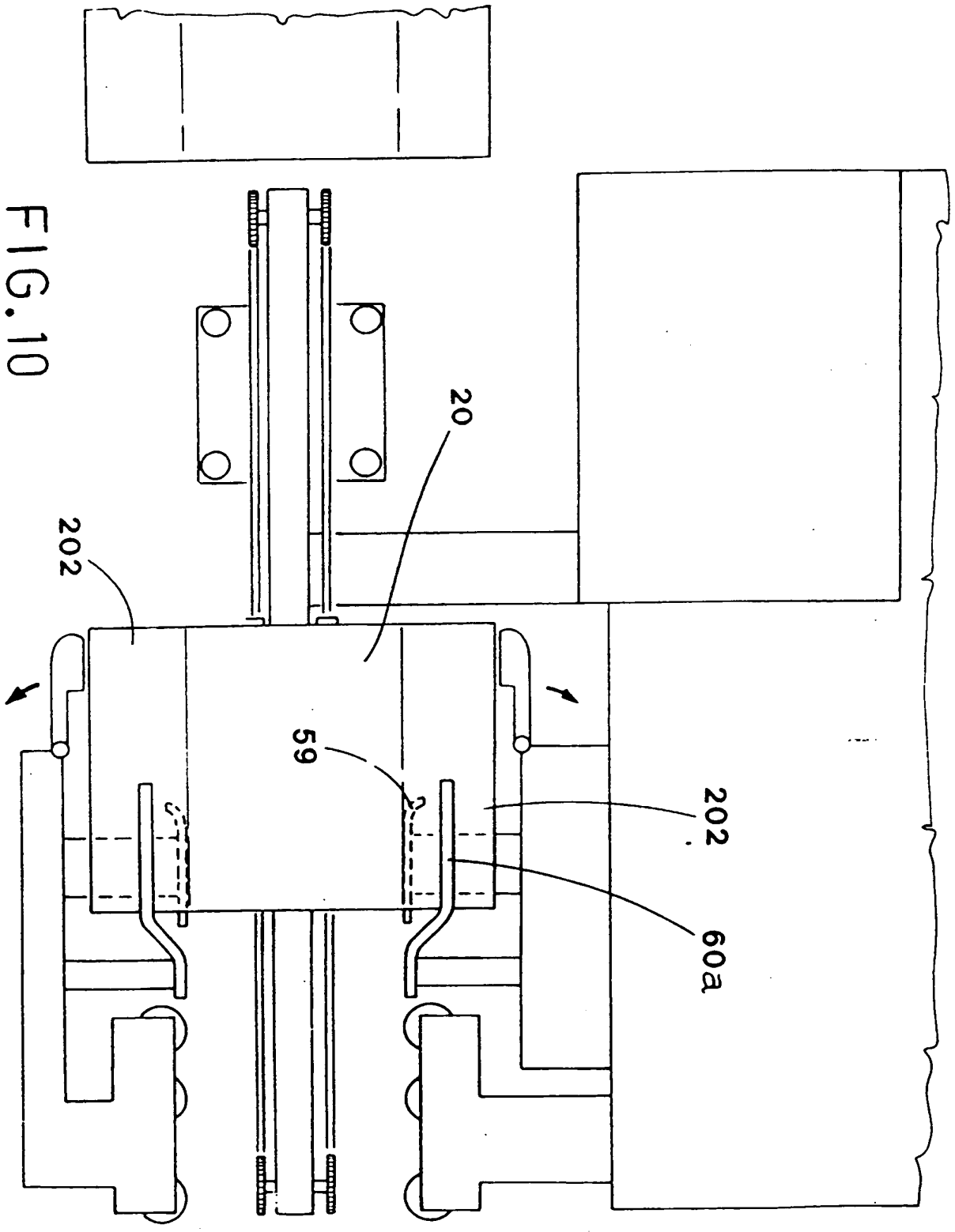
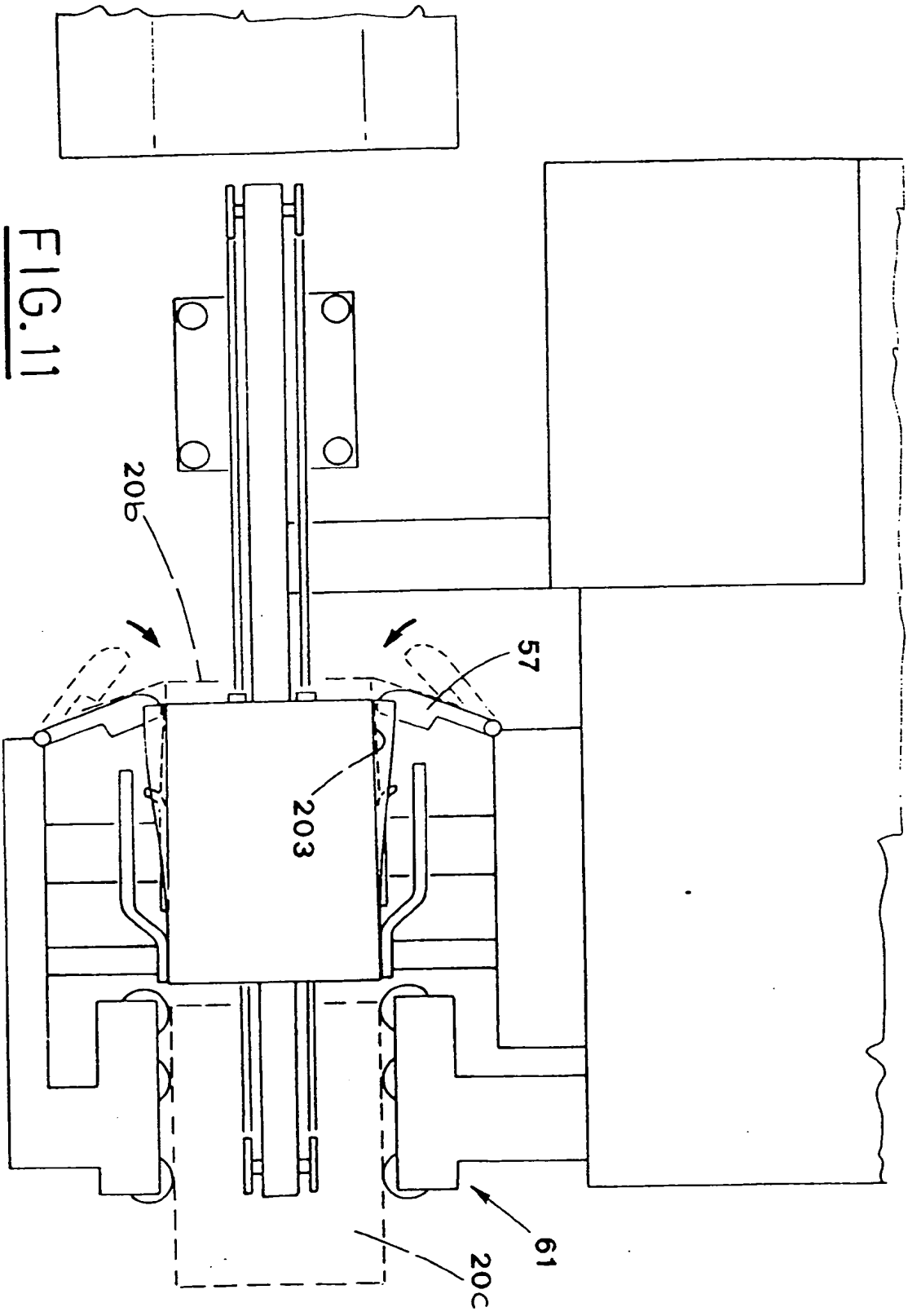


FIG.11



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EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0171

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	FR-A-2 532 912 (THERMOPAC) * the whole document * ---	1	B65B5/02
A	WO-A-95 05312 (PRAKKEN) * abstract * * page 2, line 37 - page 3, line 2; figures 1-6 * ---	1	
A	EP-A-0 036 398 (PATAROZZI) * abstract; figure 3 * -----	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16 July 1996	Claeys, H

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